

Serial No. 10/814,660  
Docket No. 00802-22708

6

REMARKS

RECEIVED  
CENTRAL FAX CENTER

OCT 03 2006

Applicants thank the Examiner for consideration of the subject patent application. In the office action mailed July 3, 2006, Claims 1-27 were pending for consideration. Claims 2, 4-6, 25, and 26 were rejected under 35 U.S.C. § 112, second paragraph, as allegedly indefinite. Claims 19-22 and 24-27 were rejected under 35 U.S.C. § 102(b) as allegedly anticipated by the article, *Ultradispersity of Diamond at the Nanoscale* (hereinafter "Raty"). Additionally, all of the pending claims were rejected under 35 U.S.C. § 103(a) as allegedly obvious in view of two or more cited references. Specifically, Claims 1-13 and 15-27 were rejected as allegedly obvious over U.S. 4,482,538 (hereinafter "Davies") in view of Raty, and Claim 14 was rejected as allegedly obvious over Davies and Raty further in view of *Cosmetics Additives: An Industrial Guide* (hereinafter "Flick"). Each of these rejections will be addressed in turn below.

By the present amendment, Claims 2, 4-6, 11, 12, 24, 25, and 26 have been amended to recite specific compositions, as opposed to the previous state of "formulated as" compositions. Support for such amendments may be found in the originally filed Claims 2, 4-6, 11, 12, 24, 25, and 26 as well as in the originally filed specification in the following locations: pg. 8, lines 7-8; pg. 10, lines 9-18; pg. 11, lines 10-11; pg. 12, lines 5-6 and 18-19; and pg. 13, lines 8-9 and 28-31. Accordingly, Applicants respectfully submit that no new matter is added by this amendment. Furthermore, such amendments are made without conceding the correctness of the present rejections and without prejudice to Applicants' right to pursue relinquished subject matter in a future patent application. Applicants believe that pending Claims 1-27 present allowable subject matter, and reconsideration and allowance thereof is respectfully requested.

Rejections under 35 U.S.C. § 112, second paragraph

The Examiner has rejected Claims 2, 4-6, 25, and 26 as allegedly indefinite. The Examiner asserted that the phrases "formulated as a skin cleanser", "formulated as a deodorant", "formulated as a dental filling", and "formulated as a lotion" render the claims vague and indefinite by not setting forth the required components of each composition.

Serial No. 10/814,660  
Docket No. 00802-22708

7

In discussing other rejections, the Examiner also cites the phrasing "formulated as" in Claims 2, 4-6, 11, 12, 25 and 26 and notes that no patentable weight was given to the physical form of the composition specified in such claims because the term "formulated as" rendered such other compositional elements merely statements of intended future use.

Applicants respectfully submit that the present amendment to Claims 2, 4-6, 11, 12, 25 and 26 removing the term "formulated as" obviate this rejection, and respectfully request that it be withdrawn. Additionally, Applicants respectfully submit that the compositional forms specified by the claims as amended should be afforded patentable weight and be considered as limiting elements.

Rejections under 35 U.S.C. § 102(b)

Claims 19-22 and 24-27 were rejected under 35 U.S.C. § 102(b) as allegedly anticipated by Raty. The Applicants respectfully submits that these claims are patentable over the cited reference for the reasons set forth below, and that the rejection should be withdrawn.

Before discussing the rejection, it is thought proper to briefly state what is required to sustain such a rejection. It is well settled that "[a] claim is anticipated only if each and every element as set forth in the claims is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 2 U.S.P.Q. 2d 1051, 1053 (Fed. Cir. 1987). Furthermore, in order to establish anticipation under 35 U.S.C. § 102, all elements of the claim must be found in a single reference. *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 231 U.S.P.Q. 81, 90 (Fed. Cir. 1986), *cert. denied* 107 S.Ct. 1606 (1987). The Applicants respectfully submits that Raty does not set forth each and every element of the rejected claims.

Raty states that ultrananocrystalline diamond films are "ideal for support of biological molecules, such as DNS, thus providing a material to integrate biological systems with electronic devices." Conversely, the rejected claims, Claims 19-22 and 24-27, present a method of binding biological molecules, comprising the steps of formulating a nanodiamond composition containing a plurality of nanodiamond particles dispersed in a biologically acceptable carrier and contacting a biological

Serial No. 10/814,660  
Docket No. 00802-22708

8

material with the nanodiamond composition such that at least a portion of the biological material becomes bonded to the nanodiamond composition.

Raty does not teach a plurality of nanodiamond particles as in the claim set, nor does it teach the biologically acceptable carrier as required by the claims. Additionally, Raty does not teach the method step of contacting a biological material with a nanodiamond composition that results in bonding. As was noted, Raty does teach a nanodiamond film. A film, by its very nature, is not a plurality of discrete particles, nor is it dispersible so as to be able to be combined with a carrier. Additionally, Raty is silent about use of a carrier, as is required by the rejected claim set. Finally, Raty does not teach bonding between a biological material and a nanodiamond composition. At most, Raty discloses supporting biological molecules with ultrananocrystalline diamond films. Applicants submit that the terms "supporting" and "bonding," describe distinctly different actions, and that the specifics and context of the Raty reference is insufficient to allow a reader to conclude that such terms could be interchangeable. Therefore, even if the aforementioned missing elements of particles and a carrier were present, Raty fails to teach the bonding between biological material and a nanodiamond composition.

Accordingly, Applicants respectfully submit that Raty fails to present each and every element of the rejected claims, and therefore does not anticipate the claims in question. Therefore, Applicants submit that the rejection of the present claims in view of Raty is improper and respectfully requests that it be withdrawn.

Rejections under 35 U.S.C. § 103(a)

The Examiner has rejected Claims 1-13 and 15-27 as allegedly unpatentable over Davies in view of Raty. Additionally, the Examiner has rejected Claim 14 as allegedly unpatentable over Davies and Raty further in view of Flick. Applicants respectfully submit that these claims are patentable over the cited reference for the reasons set forth below, and that the rejection should be withdrawn.

Before discussing the obviousness rejections herein, it is thought proper to briefly state what is required to sustain such a rejection. The issue under § 103 is whether the PTO has stated a case of *prima facie* obviousness. According to the MPEP § 2142, the Examiner has the burden and must establish a case of *prima facie* obviousness by showing the prior art reference, or references combined, teach or

Serial No. 10/814,660  
Docket No. 00802-22708

9

suggest all the claim limitations in the instant application. Further, the Examiner has to establish some motivation or suggestion to combine and/or modify the references, where the motivation must arise from the references themselves, or the knowledge generally available to one of ordinary skill in the art. Applicants respectfully submit that the Examiner has not satisfied the requirement for establishing a case of *prima facie* obviousness in any of the rejections. Particularly, the Examiner has failed to show: motivation to combine the references, likelihood of success in combining, and that if the references were combined, the resulting combination teaches all the claim limitations.

#### The Present Invention

The present invention as recited in independent Claim 1, provides for a remedial healthcare nanodiamond composition having a biologically acceptable carrier and a plurality of nanodiamond particles. The nanodiamond particles are dispersed in the carrier with a dispersant. Additionally, the nanodiamond particles have an average size of from about 0.5 nm to about 50 nm.

Likewise, independent Claim 10 is drawn to a cosmetic nanodiamond composition having a cosmetically acceptable carrier and a plurality of nanodiamond particles. As with the remedial healthcare nanodiamond composition, the nanodiamond particles have an average size of from about 0.5 nm to about 50 nm, and are dispersed in the carrier with a dispersant.

As noted above, independent Claim 19 is drawn towards a method of binding biological molecules which requires formulating a nanodiamond composition having a plurality of nanodiamond particles dispersed in a biologically acceptable carrier. Additionally, the method includes contacting a biological material with the nanodiamond composition so that at least a portion of the biological material becomes bonded to the nanodiamond composition.

#### The Davies Reference

As stated above, the Examiner has rejected all pending claims, except Claim 14, based on Davies in view of Raty. Davies teaches the incorporation of diamond particles in nail varnishes and polishes. The reference teaches that nail varnishes and polishes including diamond particles provide nails with particularly wear-resistant coating, and that the included diamond may add sparkle. Davies notes that one of the main problems with incorporating diamonds in these compositions is the difficulty of

Serial No. 10/814,660  
Docket No. 00802-22708

10

keeping the particles in suspension. To deal with this problem, Davies teaches altering the liquid base of the composition (by adding colloidal silica) to a Bingham plastic with a yield stress of not less than 0.2 Pa. Davies does not mention or infer other means of maintaining the diamonds in suspension. The diamonds Davies uses generally have a particle size of less than 30 microns, and typically in the 6 to 12 micron range.

The Raty Reference

The Examiner admits that Davies fails to teach diamond particles having the recited particle range, and points to Raty to provide that aspect of the claimed invention. As discussed previously, Raty discloses "potential technological applications" including ultrananocrystalline diamond films for support of biological molecules. Raty discusses certain nanodiamonds, called "ultradispersed diamond" or UDD, "because of their very narrow size distribution." Raty also teaches that certain conditions for the creation of nanodiamonds can generate UNCD films, or "ultrananocrystalline diamond" films, and that such films might be used to "support" biological molecules and therefore allow for the creation of devices which integrate the biological molecules with electronic circuitry.

Lack of each and every element by the combination of Davies and Raty

Davies in view of Raty does not teach each and every element of Claims 1 or 10. Specifically, the inclusion of a dispersant with the diamonds in the carrier is not taught or suggested. The addition of the colloidal silica in the Davies reference does not act as a "dispersant", but merely converts the liquid base to a Bingham plastic with a yield stress of not less than 0.2 Pa (i.e. changes the flowability properties of the liquid base). Neither Raty nor Davies teaches, infers or alludes to the inclusion of a dispersant within the carrier. Davies teaches altering the fluid properties to affect the suspension of diamonds, and does not suggest adding a dispersant. Raty does not teach a fluid composition, and therefore cannot be interpreted to teach a dispersant.

Furthermore, the combination of Raty and Davies does not teach nano particles. Claims 1 and 10 specifically claim nanodiamond particles having a particle size of from about 0.5 nm to about 50 nm. Davies teaches diamond particles having a size that is clearly outside of the nano-size range. Raty doesn't even teach particles. Rather, it teaches a nanodiamond film. Therefore, the combination of references does not teach nanoparticles, as is claimed in the present invention. As an element is

Serial No. 10/814,660  
Docket No. 00802-22708

11

missing, the Examiner has not presented a *prima facie* case of obviousness over the combined references.

Likewise, the combination of Davies and Raty does not teach each and every element of Claim 19. The combination does not teach a nanodiamond composition containing a plurality of nanodiamond particles. Davies teaches a composition including diamond particles. This is not a nanodiamond composition. Raty teaches a nanodiamond film. Again, this is not a nanodiamond composition. Furthermore, the combination would not lead to a nanodiamond composition as is presently claimed because discrete nanodiamond particles are not taught by either reference.

Additionally, the combination fails to teach the bonding of the biological material to the nanodiamond composition as required in Claim 19. To reiterate a previous point, at most, Raty discloses supporting biological molecules with ultrananocrystalline diamond films. Applicants submit that the terms "supporting" and "bonding" describe distinctly different actions, and that the specifics and context of the Raty reference is insufficient to allow a reader to conclude that such terms could be interchangeable. Davies also fails to teach the bonding to a nanodiamond composition, for lack of a nanodiamond composition.

Lack of motivation to combine Davies and Raty

There is no motivation to combine the references Davies and Raty. The Examiner erroneously argues that because (1) Davies discusses the problem of suspending the particles in the liquid base and (2) Raty teaches nanodiamonds with ultradispersity, there would be a reasonable expectation of success by combining the teachings.

The Examiner cites the portion of the article that notes that "nanodiamonds are often called 'ultradispersed diamond' (UDD) because of their very narrow size distribution" as motivation. The Examiner erroneously interprets the term 'ultradispersed diamond' to be indicative of the nanodiamond properties in solution. However, as read in context within the meaning of the article, paragraph, and even simply the sentence, the meaning of 'ultradispersed' is indicative of the size and/or uniformity of the nanodiamond particles. Therefore, there would be no motivation to combine the references based on the dispersibility properties of nanodiamond as presented in Raty. Close reading of the Raty reference shows another misinterpretation present in the Examiner's position. The ultradispersed diamond

Serial No. 10/814,660  
Docket No. 00802-22708

12

presented in Raty is not the ultrananocrystalline diamond film Raty discloses as having potential technological applications such as support for biological molecules. The ultradispersed diamonds of Raty are not the ultrananocrystalline diamond film of Raty and the two should not be confused. To restate, even if the dispersibility discussed in Raty was of the type desired in the Davies compositions (which it clearly is not), the ultradispersed diamonds of Raty are not the ultrananocrystalline diamond film, which the examiner cites as having the dispersibility properties.

Motivation to combine is not found in Davies. While Davies does note that there is a problem with suspending diamond particles in the liquid base, Davies does not state or infer that addition of a substance, like a dispersant, would be beneficial to the suspension. Rather, Davies directly alters the properties of the liquid base. The proposed solution to the diamond suspension problem in Davies clearly demonstrates methodologies of directly altering the properties of the solution. Davies does not suggest in any manner that an alternate method of keeping diamond particles in suspension would be the use of an additional substance, like a dispersant. Davies, therefore, does not provide motivation to combine with Raty.

Lack of sufficient likelihood of success to combine Davies and Raty

Finally, there is little likelihood of success if Davies and Raty were to be combined. Specifically, there is frustration of purpose in combining the references in that the combinations would not (a) solve the dispersibility problem the Examiner relies on for motivation to combine.

The Examiner relies on Davies' identification of a difficulty keeping diamond particles dispersed as motivation to combine with Raty. As noted previously, the Examiner erroneously purports that Raty teaches nanodiamonds that are ultradispersible. Rather, the references teaches certain nanodiamonds with unique size distribution, which as a result, are called "ultradispersed diamond". Another distinct material in the Raty reference, ultrananocrystalline diamond films, is cited as possible support for biological molecules. As such, the ultrananocrystalline diamond films are what may be used in relation to biological molecules. Films inherently are generally not dispersible. By the very nature of the term film, the reference indicates that the ultrananocrystalline diamond is in the form of a layer having a definite size, large surface area, elongated shape, and composed of multiple distinguishable parts.

Serial No. 10/814,660  
Docket No. 00802-22708

13

Films, then, are naturally not dispersible due to their size and shape. Therefore, the addition of the nanodiamond film of Raty to the nail varnishes and polishes of Davies would not be expected to improve dispersibility. If the references were combined, there would be very little expectation of successfully creating a nail polish or varnish composition with dispersed nanodiamonds.

Davies in view of Raty, therefore, does not present a *prima facie* case of obviousness over the rejected claims. The combination fails for not presenting each and every element of the claims, for offering no motivation to combine the references, and for frustration of purpose leading to small likelihood of success if the references were combined. Accordingly, Applicants respectfully submit that the rejection of the claims in view of Davies in view of Raty is improper and respectfully request that it be withdrawn.

Lack of each and every element in combination of Davies, Raty and Flick

The Examiner has rejected Claim 14 as being obvious over Davies and Raty as applied to Claims 1-13 and 15-27, and further in view of Flick. Flick was cited to provide the teaching of using stearalkonium hectorite in nail lacquers. Flick does indeed teach using this chemical in nail lacquers, however, Flick does not remedy the inherent problems with the Davies-Raty combination as discussed above. Specifically, the combination does not teach nanodiamond particles; there is no motivation to combine, nor is there sufficient likelihood of success in the combination. Flick's addition of stearalkonium hectorite in nail lacquers does not teach the nanodiamond particles of the claimed invention. Again, Raty teaches nanodiamond film, and not nanodiamond particles dispersed in a carrier.

Lack of motivation to combine Davies, Raty and Flick

There is a lack of motivation to combine Flick with either reference. In addition to the aforementioned lack of motivation inherent with the Davies-Raty combination, Flick does not offer any motivation to combine with either reference. Flick merely shows a composition including a specific dispersant present in a nail lacquer. Although both Flick and Davies show nail lacquer compositions, Davies specifically teaches that the diamond particulates are suspended due to the manipulation of the carrier itself, not through addition of a dispersant. Even if the combination of Davies and Flick were proper, there is still no motivation to combine with Raty for the reasons recited above.



Serial No. 10/814,660  
Docket No. 00802-22708

14

Lack of sufficient likelihood of success in the Davies, Raty and Flick combination

The combination of Davies, Raty and Flick does not have a likelihood of success. There are inherent problems with the Davies-Raty combination such as problems dispersing a nanodiamond film in a nail lacquer, which are worthy of reiteration. Furthermore, Davies manipulates the carrier of the lacquer in order to keep diamond particles in suspension, whereas Flick shows the presence of a specific dispersant. Neither Davies nor Flick indicates that both methodologies may be used in tandem. Conversely, the combined references, taken as a whole, would lead one of ordinary skill to suppose that there are possibly two alternative means of suspending particles in a nail lacquer.

Therefore, the combination of Davies, Raty and Flick does not show each and every element of the claimed invention, and is not a proper combination due to lack of motivation to combine and insufficient showing of likelihood of success. As such, Applicants respectfully request that the rejection be withdrawn.

Serial No. 10/814,660  
Docket No. 00802-22708

RECEIVED  
CENTRAL FAX CENTER

UCT 03 2006

15

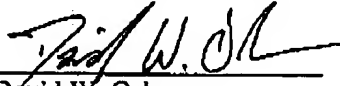
CONCLUSION

In view of the foregoing, Applicants believe that Claims 1-27 present allowable subject matter and allowance is respectfully requested. If any impediment to the allowance of these claims remains after consideration of the above remarks, and such impediment could be removed during a telephone interview, the Examiner is invited to telephone the undersigned attorney at (801) 566-6633 so that such issues may be resolved as expeditiously as possible.

Please charge any additional fees except for Issue Fee or credit any overpayment to Deposit Account No. 20-0100.

Dated this 3rd day of October, 2006.

Respectfully submitted,

  
David W. Osborne  
Attorney for Applicants  
Registration No. 44,989

Of:

THORPE NORTH & WESTERN, LLP  
8180 South 700 East, Suite 200  
Sandy, Utah 84070  
(801) 566-6633

DWO/SAA:ja